I Claim:

1. A crystal controlled oscillator which includes means for steering the frequency of oscillation to a particular mode of the crystal during the build up of oscillation by injecting a signal into the oscillator augmenting the noise energy available for oscillations to build up on the desired mode.

2. A crystal oscillator of claim 1 in which a frequency synthesizer which includes an independent frequency reference is used to produce a steering injection signal close in frequency to the desired mode.

3. The crystal oscillator of claim 2 in which the frequency synthesizer is fine tuned to reduce the build up time of oscillations by precisely positioning the injection signal at the anticipated resonance of the desired mode.

4. The crystal oscillator of claim 2 in which the independent frequency reference is a VCXO which was fine tuned by the mode steering crystal oscillator in the recent past.

5. The crystal oscillator of claim 2 in which the VCXO is temperature compensated using two or more modes of oscillation in the mode steering oscillator.

6. The crystal oscillator of claim 2 in which the frequency spectrum of the frequency synthesizer is broadened by modulating phase noise onto the output or sweeping the frequency.

7. The crystal oscillator of claim 1 in which an auxiliary oscillator is used to produce the mode steering injection signal.

8. The crystal oscillator of claim 1 in which the mode steering signal is removed after oscillations have saturated the oscillator on the desired mode of oscillation.

9. The crystal controlled oscillator of claim 1 in which initiation of oscillation and mode steering are delayed until the oscillator has reached the operating temperature if a crystal oven is used.

10. A crystal oscillator comprising a gain element that is frequency selective due to saturation at one frequency; a crystal resonator capable of being excited on different modes; a frequency synthesizer with an independent frequency reference generating an injection signal capable of encouraging oscillation on a desired mode.

11. The crystal oscillator of claim 10 in which the frequency synthesizer is broadened by modulating noise onto the output or by sweeping the frequency.

12. The crystal oscillator of claim 10 is which the injection signal is removed after oscillations have stabilized on the desired mode of oscillations.

13. The crystal oscillator of claim 10 in which the frequency reference for the frequency synthesizer is a VCXO, being fine tuned by the mode steering crystal oscillator in the recent past.

14. The crystal oscillator of claim 10 is which the VCXO is temperature compensated by using two or more modes of oscillation in the mode steered crystal oscillator.

15. The crystal oscillator of claim 10 in which the frequency synthesizer is fine tuned to the anticipated frequency of the desired mode to reduce the build up time of the desired mode.

16. The crystal oscillator of claim 10 is which initiation of oscillation is delayed until the oscillator has reached the operating temperature if a crystal oven is used.

17. A crystal oscillator compromising a gain element that is frequency selective due to saturation at one frequency; a crystal resonator capable of being excited on different modes; an auxiliary oscillator generating a frequency near the desired mode in the crystal resonator. A

switching means to connect the injection signal to the mode controlled crystal oscillator until saturation has occurred and then removing it.

18. A crystal oscillator of claim 17 in which the frequency spectrum of the auxiliary oscillator is broadbaned by modulation using band limited noise or pseduonoise.